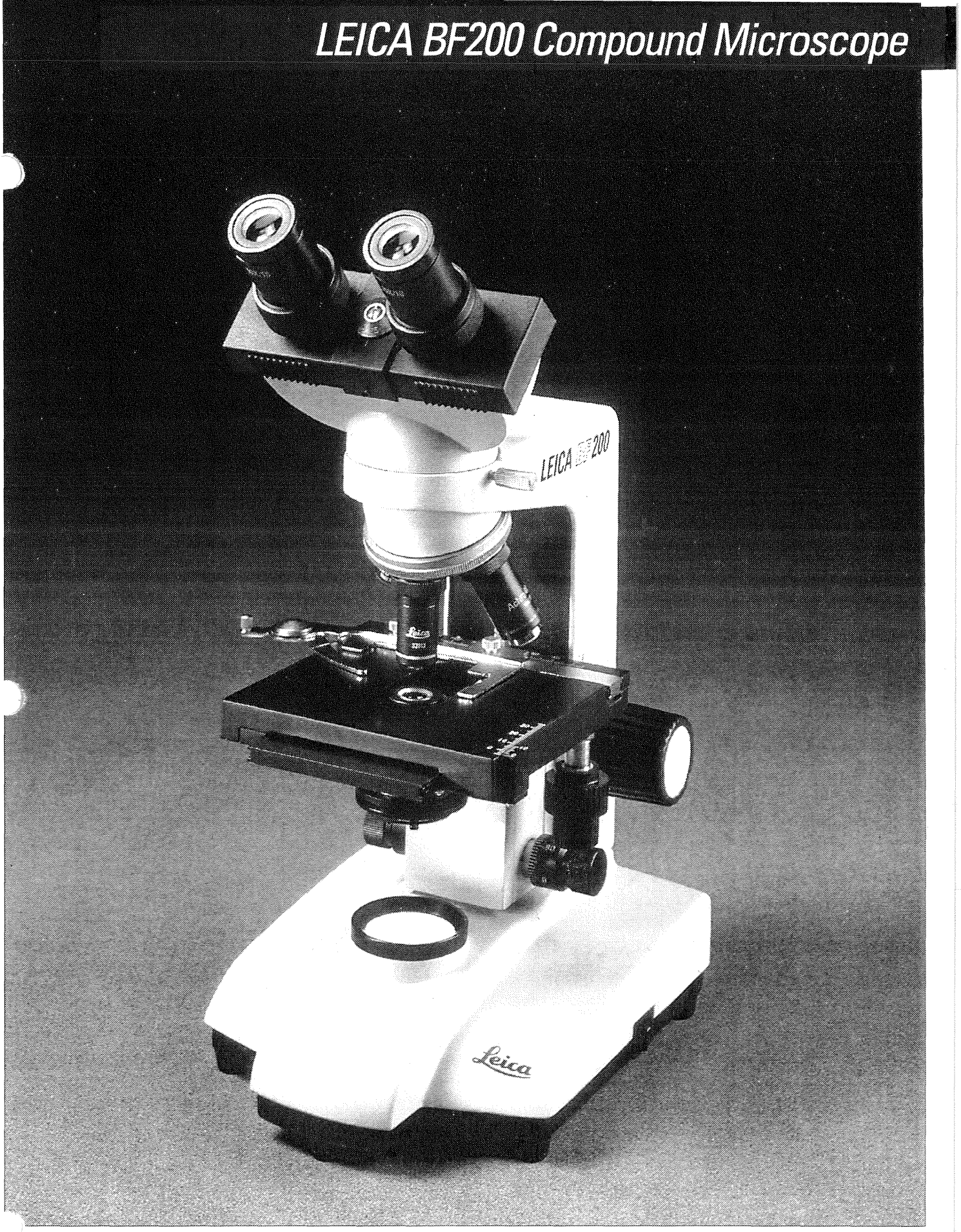
LEICA BF200 Compound Microscope



Service Manual

Leica

LEICA BF200
Compound Microscope
Service Manual

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1.0 INTRODUCTION

The LEICA BF200 Compound Microscope is designed specifically for student use in secondary schools. High quality glass optics and a variety of accessories make the BF200 Compound Microscope the ideal choice to meet diverse applications.

Contact your local Leica Representative for more information, questions or parts ordering.

NOTE: All service is to be performed by qualified service personnel only.

Explanation of Warning Symbols

CAUTION: Replace with same type and rating fuse 5x20 Type T Rated 250mA T/250V

CAUTION: Risk of electric shock

CAUTION: (Refer to accompanying documents)

Part #	Description	#
13320010	10x Eyepiece	1
13320020	10x Eyepiece with pointer	1
13320030	15x Eyepiece	1
13320050	Monocular Body (includes Monocular Body and Eyepiece Locking Screws)	2
13320040	Binocular Body	3
1332000-124	Binocular Body Thumb Screw	4
13320060	Monocular Teaching Body (includes Monocular Teaching Body, and Eyepiece Locking Screws)	5
1332000-125	Eyepiece Locking Screws	6
13320070	Stand/120V, Abbe Condenser and Fluorescent Lamp (does not include objectives or Body)	7
13320080	Stand/230V, Abbe Condenser and Fluorescent Lamp (does not include objectives or Body)	7
13320090	Stand/120V, Disc Diaphragm and Fluorescent Lamp (does not include objectives or Body)	7
13320100	Stand/230V, Disc Diaphragm and Fluorescent Lamp (does not include objectives or Body)	7
13320110	Stand, Disc Diaphragm and Mirror Illuminator (does not include objectives or Body)	7
1332000-127	Coarse Adjustment Shaft	8
13X54242	Monocular/Teaching Body Set Screws	9
1332000-120	Stage Stop Screw	10
1332000-119	Coarse Adjustment Knob Assembly (includes washer, set screws, lock screws, circular disc and plastic knob)	11
1332000-121	Fine Adjustment Knob Assembly-Right-Graduated (includes set screws)	12
1332000-122	Fine Adjustment Knob Assembly-Left (includes set screws)	13
1332000-126	Fine Focus Assembly (with fine focus knobs)	14
13320120	4x Achromatic Objective	15
13320130	10x Achromatic Objective	15
13320150	40x Achromatic Objective	15
13320300	60x Achromatic Objective	15
13320160	100x Achromatic Objective	15
13320260	4x Semi-Plan Objective	15
13320270	10x Semi-Plan Objective	15
13320280	40x Semi-Plan Objective	15
13320290	100x Semi-Plan Objective	15
1332000-111	Stage Clip Assembly (includes clip, screw, spring and spacer)	16
13320180	Mechanical Stage (includes Slide Holder Assembly)	17
1332000-130	Slide Holder Assembly	18
1332000-116	Abbe Condenser Assembly (includes Iris Assembly)	19
1332000-117	Iris Assembly	20
13320190	Fluorescent Lamp	21
13WHDL30015	Lamp Socket	22
13WFAG20044	Fuse	23
13WSWT20024	On/Off Switch	24
1332000-118	Rubber foot	25
13WXFM24023	230V, 50Hz Lamp Ballast	26
13313529-606	230V Electrical Cord (with strain relief, 3 terminals and plug)	27
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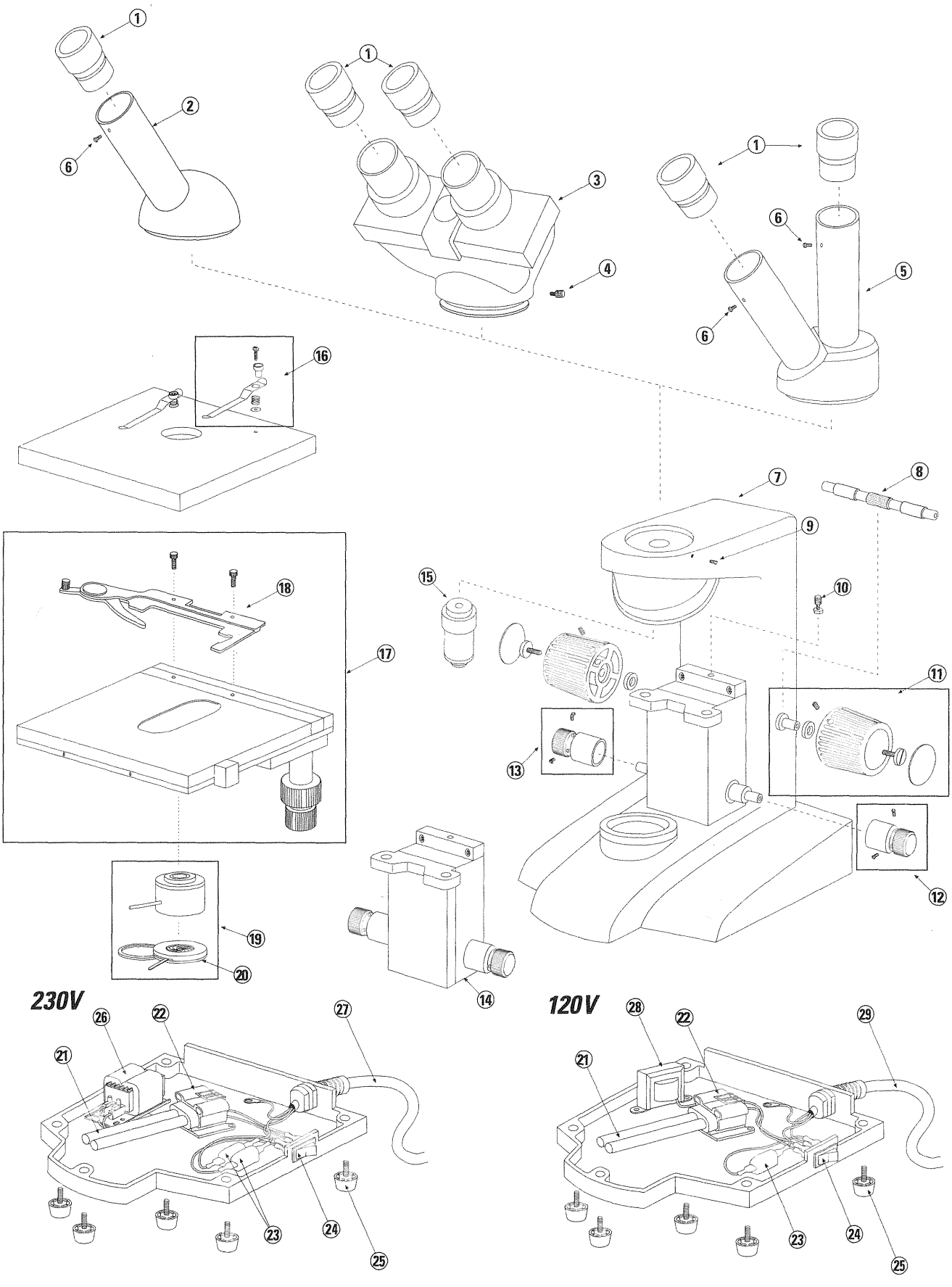
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2.0 COARSE ADJUSTMENT KNOB REPLACEMENT

Tools

1. Hex wrench set
2. 3.5 inch diameter wheel puller (if required, Both knobs removed)
3. Screw driver, 3/8" blade
4. Small jeweler's screwdriver
5. ACC cement

Materials

1. Coarse Adjustment Knob 1332000-119

Procedure

A. Disassembly (right Coarse Adjustment Knob 1332000-119)

1. Using the Coarse Adjustment Knob, move the stage upward until it engages the Stage Stop screw.
2. Remove the decorative center of the Coarse Adjustment Knob by using a small screw driver or bent wire. Insert either tool into the small hole on the outside diameter of the decorative disk. Gently, apply pressure until the disk snaps out of the Coarse Adjustment Knob.
3. Loosen the Coarse Adjustment Knob set screws with the appropriate size hex wrench. Back off approximately 2 turns.
4. Remove the Coarse Adjustment Shaft retaining screw located inside the Coarse Adjustment Knob, using a standard screw driver. Remove screw and set aside for reassembly.
5. While holding the opposite Coarse Adjustment Knob, apply a counter clockwise pressure until the knob spins free from the shaft.

B. Disassembly (left Coarse Adjustment knob)

1. Perform steps 1-5 under the right Coarse Adjustment Knob removal, except if both knobs are to be removed, then follow part B2.
2. Left **and** Right Coarse Adjustment knob removal – Using the 3.5 inch wheel puller, center of the puller's shaft where Coarse Adjustment Shaft retaining screw was located, and the fingers of the puller of the shaft on the outside diameter of the knob closest to the body of the microscope with hand pressure snug up the wheel puller. Apply pressure with the wheel puller to break the knob free of the Coarse Adjustment Shaft.

C. Assembly

1. If both knobs have been removed, assemble the left knob first. Assembly is the reversal of the disassembly process.
2. The right hand knob is assembled in reverse of the disassembly process.
3. **ADJUSTMENT OF TENSION FOR STAGE DRIFT:** Tighten the right knob in a clockwise direction. If the stage can be moved using the Coarse Knobs, the nylon spacer will have to be increased in width. To do so, disassemble the right Coarse Focus Knob (per procedure above), and remove the nylon spacer from the Coarse Adjustment Shaft. Replace with the next thickest nylon spacer. When the stage can be adjusted so vertical movement can removed, the spacer adjustment is complete. Loosen the Coarse adjustment knobs until the vertical stage movement is free but tight enough not to yield stage drift.
4. When installing the decorative centers, place three equally spaced dots of ACC on the first molded shoulder inside knob. With paint side out, press decorative centers into Coarse Adjustment Knob and let dry.

3.0 FINE ADJUSTMENT KNOB REPLACEMENT

GENERAL: Locations of left or right are defined as the position the instrument would be in during normal operation.

Tools

1. Small jeweler's screwdriver (standard blade)

Materials

1. Fine Adjustment Knobs 1332000-121 (right, graduated) 1332000-122 (left)

Procedure

A. Disassembly (right, Fine Adjustment Knob 1332000-121)

1. Loosen both of the Fine Adjustment Knob set screws with a small jeweler's screwdriver. Back off approximately 1 1/2 – 2 turns.
2. With a pencil, lightly mark the body with the location of the set screw closest to the 40 gradation line. This provides a relationship to the stop inside the knob assembly.
3. Hold the left Fine Adjustment Knob and remove the right Fine Adjustment Knob by pulling the knob away from the body.

B. Assembly

1. While holding the left Fine Adjustment Knob, position the right Fine Adjustment Knob on the fine adjustment shaft. Align the pencil mark to the 40 gradation mark and push the Right Adjustment Knob until it is seated on the Fine Adjustment Shaft.
2. Retighten the 2 set screws. Clean pencil mark.
3. If properly installed, there will be eight complete turns of the Fine Adjustment Mechanism from stop to stop.

C. Disassembly (Left, Fine Adjustment Knob 1332000-122)

1. Loosen both of the Fine Adjustment Knob set screws with a Small jeweler's screwdriver. Back off approximately 1 1/2 – 2 turns.
2. Pull knob off.

D. Assembly

1. Installation is the reverse of part C.

3.1 Fine Focus Drive Mechanism Removal and Repair

NOTE: Repairs to this mechanism should be limited for the following conditions:

A. Loss motion - cam lever loses contact with cam or pin strike within the FA knobs.
B. Gritty Feeling- relationship of cam lever following in cam.

All service procedures are to be performed by qualified service personnel only!

Tools

1. Hex wrenches that fit 4 mm or smaller metric screws.
2. Set of jeweler's screwdriver
3. 7mm spanner (open end) wrench.
4. Normal size Phillips screwdriver

Procedure

Disconnect the microscope from the power source. Place the instrument in a horizontal position (a position that allows easy access while working under stage) using a surface with a protective cover to reduce the scratching of painted surfaces.

A. Electrical Base Removal

1. Using the 3mm hex wrench loosen the retaining screw inside the five feet. Unscrew the five feet using a counter clockwise motion until the feet are free from base.
2. Remove the base from the stand of the scope. (Beware of Ground washer on outcropped foot location)

B. Base Cover Removal

1. Remove the 4 screws holding the cast base cover to the arm assembly.

C. Disassembly of Fine Focus Drive Mechanism

1. Pull Fine Focus Drive Mechanism out of Stand
2. Remove Stage by removing the two 4 mm screws that retain the stage assembly. Check Stage Arm for any shims. If shims are in use, note the stage arm side and thickness, and set aside for the reassembly process.
3. Remove screws that retain the top cover plate. Caution; top cover is spring loaded. Hold cover in place with fingers, remove cover and remove spring.
4. Remove Stage Slide by pulling out of track past top cover plate.

D. Determination of problem based on repair note

Loss motion: Cam Lever; Inspect the Cam Lever for free movement. If Cam Lever is not free or not tracking in shaft , the retaining screw (Figure 2, A) will require shimming to obtain proper movement. If motion has hard spots move to pin strike description.

Gritty Movement: Inspect Cam Lever's shape at the shaft end (Figure 2, B). Remove retaining screw. Review for wear patterns in lever point. Shape point to meet camshaft grove, and polish point to ensure free movement.

Loss motion due to pin strike will be discussed after reassembly of Fine Focus Drive Mechanism is complete.

E. Assembly Fine Focus Drive Mechanism is the reverse of the steps identified part C in steps 3 and 4.

Loss motion due to pin strike: (Figure 3, B -Pin) locate the hard spot in the mechanism and perform the following:

Procedure: (right, FA Knob 1332000-121)

1. Loosen both of the Fine Adjustment Knob set screws with a Small jeweler's screwdriver. Back off approximately 1 1/2 - 2 turns.
2. With a pencil lightly mark the body of the assembly with the location of the position of the set screw to provide a relationship for reassembly. Caution: do not turn Fine Adjustment Shaft.
3. Remove the right Fine Adjustment Knob by pulling the knob away from the body. Inside of the Fine Adjustment Knob is a small screw (Figure 3, A), loosen screw a 1/4 of a turn.
4. Reassemble knob to shaft maintaining proper relationship. Try movement, if hard spot remains, perform same procedure to left FA knob (1332000-122)
5. Clean pencil marks.

F. Final Assembly of Fine Focus Drive Mechanism and Microscope

1. Install the stage onto the stage arm. (reinstall shims if any) Install the 4mm screws and tighten.
2. Install the Fine Focus Drive Mechanism in stand. Push mechanism until gears of the Coarse focus engage the mechanism's gear rack. Use the Coarse adjustment knobs to move the mechanism into Stand.
3. Install and start the 4 screws holding the cast base cover to the arm assembly. Tighten all 4 screws.
4. Install the base from the stand of the scope. (Beware of Ground washer on outcropped foot location)
5. Install the five feet and tighten the retaining screw in each one.

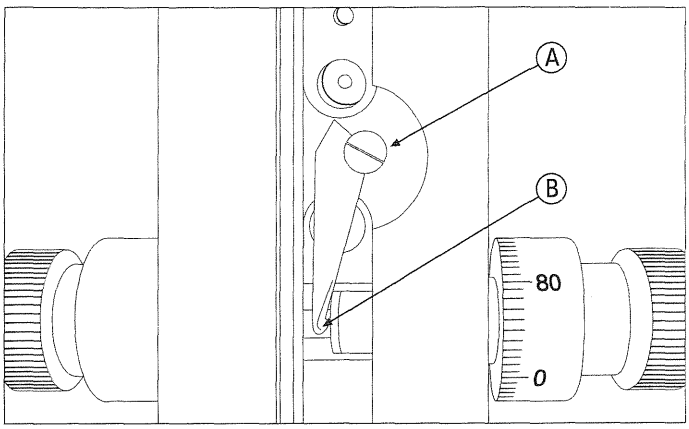

Figure 2

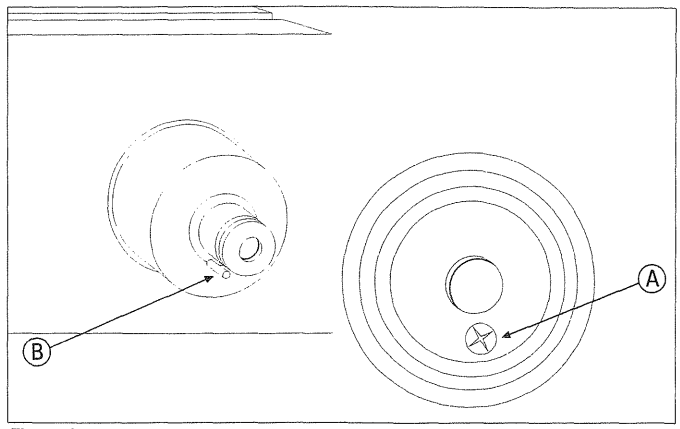

Figure 3

4.0 MECHANICAL STAGE INSTALLATION

NOTE: This service procedure is to be performed by qualified service personnel only.

Tools

1. Set of jeweler's screwdriver
2. Hex wrenches that fit 4mm or smaller metric screws.
3. 7mm spanner (open end) wrench.

Materials

1. Mechanical Stage Assembly 13320180

Procedure

A. Preparation

1. Disconnect the microscope from its power source.
2. Place the microscope in a horizontal position (a portion that allows easy access while working under the stage) using a surface with a protective cover to reduce the scratching of painted surfaces.

B. Removal of Stage

1. Move the Stage to its upper limit of travel.
2. Remove the two 4mm screws that retain the stage assembly. Check Stage Arm for any shims. If shims are in use, note the Stage Arm side and thickness, and set aside for the reassembly process.

C. Installation of Mechanical Stage 13320180

1. Install the Mechanical Stage onto the Stage Arm. (reinstall shims if any) Install the 4mm screws but do not tighten.

D. Mechanical Stage Adjustment

1. Position the microscope in the operating position and reconnect it to the power source. Turn on the instrument.
2. Place a stage micrometer onto the stage, raise the Abbe Condenser to the top position. Move the 10x objective into position and focus the stage micrometer. Move the 4x objective into position and look for "cutoff" or "clipping" on the edge of the field of view. Lower the condenser to its lowest position and close down the Condenser Iris. Center the aperture opening in the field of view by moving the Stage Assembly.
3. Insert the hex key wrench in one of the 4mm Stage Screws and gradually tighten the screw. While observing through the microscope, maintain the centration of the condenser by alternating between the two 4mm stage screws. When tight, perform a final check of centration, and remove hex key wrench.
4. Move the Abbe Condenser assembly to the top of its travel. Open the Iris and move the 10x objective into viewing position. Set the Fine Adjustment to its mid-range location and focus on the stage micrometer with the Coarse Adjustment Knobs from the bottom up. Adjust the auto focus stop screw and lock in place by tightening the nut with a 7mm open end wrench. The instrument is now ready for use.

5.0 STAGE STOP SCREW REPLACEMENT

GENERAL: Locations of left or right are defined as the position the instrument would be during normal operation.

Tools

1. 7mm spanner wrench (open end wrench)

Materials

1. Stage Stop Screw Replacement 1332000-120

Procedure

A. Disassembly

1. Using the 7mm spanner wrench loosen the nut mounted on the stage screw. Unscrew the screw using a counter clockwise motion.

B. Assembly

1. Move the Coarse Adjustment to the top of its travel. Install new screw and nut assembly. Turn screw in until it bottoms on the internal stage gear rack.

C. Adjustment

1. While holding screw by the vertical knurls run the lock nut down until it contacts the plate. Using the 7mm spanner wrench, tighten a 1/4 of a turn from this position.

6.0 STAGE CLIP ASSEMBLY

Tools

1. Small screwdriver (Phillips 1/8" blade)

Materials

1. Stage Clip Assembly 1332000-111 (reference only) This assembly is made up of the following parts in order of assembly: Stage Clip Screw 1332000-123, Stage Clip 1332000-112, Stage Clip Spring 1332000-113 and Stage Clip Spacer 1332000-114

Procedure

A. Disassembly/Assembly 1332000-111

1. With the assembly on the stage, hold the Stage Clip Assembly between the thumb and index finger. With the small Phillips screw driver loosen the stage clip retaining screw while absorbing the spring tension with the finger and thumb. When screw is completely unscrewed lift the assembly away from the stage.

B. Assembly

1. Reassemble the parts in the order identified under the materials section. Hold the assembly in the hand in a manner the index finger applies pressure to the screw and spacer. (Ensure that the stage clip has the long arm down towards the stage.)
2. Position screw into the tapped hole in the stage, remove the index finger from the screw head, and tighten screw with the small Phillips head screwdriver.

C. Adjustment

1. If required, the clip may require small adjustments to apply correct pressure to slides. This is done by applying hand pressure only to the clip, with a gradual adjustment to obtain the desired pressure and location for the slide being used.

7.0 ABBE CONDENSER REPLACEMENT

GENERAL: CARE and cleanliness should be emphasized while working around the Iris Assembly (parts are easily deformed) and the Abbe Condenser Assembly (ensure no dirt is allowed in open iris onto the Abbe lens). Maintain the Microscope in a horizontal position (a position that allows easy access while working under the stage) using a surface with a protective cover to reduce the scratching of painted surfaces.

Tools

1. Set of jeweler's screwdrivers

Materials (depending on level of replacement)

1. Abbe Condenser Assembly 1332000-116
2. Iris Assembly 1332000-117

Procedure

A. Removal of Abbe Condenser with Iris Assembly 1332000-116

1. Move the stage to its upper limit of travel.
2. Move the chrome lever so that it is perpendicular to the right stage edge.
3. Remove chrome lever which retains the Abbe Condenser and Iris Assembly to the condenser mount under the stage.
4. Slide Condenser Assembly straight out of condenser mount.

B. Installation of Abbe Condenser with Iris Assembly is the reverse of Part A of the above procedure.

C. Disassembly of Iris Assembly 1332000-117

1. Remove the Abbe Condenser Assembly per the previous instructions.
2. Place the Abbe & Iris Assembly on a clean surface. On the outside diameter of the Abbe Condenser, there are screws that retain the Iris assembly. Loosen each screw three turns or until the Iris assembly can be removed from the condenser body. Lift the Iris Assembly away from the condenser assembly.
3. Install the new Iris Assembly (1332000-117) onto the Condenser Body. Align the iris actuating lever to the hole for the chrome lever for the condenser. With finger pressure, press the condenser body and Iris assemble together. Tighten the screws.
4. Clean the Iris Assembly and the inside condenser lens to remove paint flakes and smudges.
5. Reinstall the Abbe Condenser and Iris assembly per instructions in Section B of this procedure.

8.0 FOOT REMOVAL AND REPLACEMENT

CAUTION: If base is to be removed to gain access to electrical components disconnect the microscope from its power source.

Tools

1. 3mm hex key wrench

Materials

1. Replacement Foot Assembly 1332000-118

Procedure

A. Disassembly

1. Using the 3mm hex wrench, loosen the retaining screws inside the foot. Unscrew the foot using a counter clockwise motion until the foot is free from base.

B. Assembly

1. Assembly is the reversal of the disassembly. Do not over tighten 3mm screw which could deform the rubber foot.

9.0 MICROSCOPE ELECTRICAL CORD REMOVAL AND REPLACEMENT

CAUTION: If the base is to be removed to gain access to electrical components, disconnect the microscope from its power source.

Tools

1. 3mm hex key wrench
2. Small Phillips screw driver 1/8" blade. (removal of ground screw)
3. Pair of small channel lock style pliers (removal of strain relief)

Materials

1. Replacement Electrical Cord Assembly
   120V 60Hz. 13313540-127
   230V 50Hz. 13313529-606

Procedure

A. Disassembly

1. Using the 3mm hex wrench, loosen the retaining screw inside the five feet. Unscrew the five feet using a counter clockwise motion until the feet are free from base.
2. Remove the base from the stand of the scope.
   (Beware of ground washer on outcropped foot location)
3. Place the channel lock style pliers on the top of the retaining tab of the strain relief. (tab is located outside of base on the bottom side of base) Squeeze the locking tab in and use a horizontal wiggle motion to free strain relief from the base.
4. Remove the screw that retains the green ground (earth) wire to the base.
5. Disconnect the black wire that runs to the fuse block and the white wire that connects to the switch. Pull power cord free from the base.

B. Assembly

1. Reassemble of the assembly is the reverse of steps 1-5 part A.

NOTE: Be sure to reinstall ground washers in the correct position to insure proper grounding.

10.0 LAMP REMOVAL AND REPLACEMENT

CAUTION: If base is to be removed to gain access to electrical components disconnect the microscope from it's power source.

Tools

1. 3mm hex key wrench
2. Wire Cutters (if required)

Materials

1. Replacement Lamp Assembly 13320190

Procedure

A. Disassembly

1. Using the 3mm hex wrench, loosen the retaining screw inside the five feet. Unscrew the five feet using a counter clockwise motion until the feet are free from base.
2. Remove the base from the stand of the scope.
   (Beware of ground washer on outcropped foot location)
3. Cut cable tie retaining lamp. (Used for shipping purposes only)
4. Using a screw driver pry up spring metal tab holding lamp while pulling light forward until free from socket.

B. Assembly

1. Push new lamp into socket. Cable tie is not required. Reassemble the remaining assembly, reversing steps 1-2 of Part A.

NOTE: Be sure to reinstall ground washers in the correct position to insure proper grounding.

11.0 BALLAST/TRANSFORMER REMOVAL AND REPLACEMENT

CAUTION: If base is to be removed to gain access to electrical components disconnect the microscope from its power source.

Tools

1. 3mm hex key wrench
2. Small Phillips screwdriver 1/8" blade. (removal of ballast/light)
3. Small regular screwdriver 1/8" blade.

Materials

1. Replacement of Ballast
   120V 60Hz. 13WXFM24024
   230V 50Hz. 13WXFM24023

Procedure

A. Disassembly

1. Using the 3mm hex wrench loosen the retaining screw inside the feet. Unscrew the feet using a counter clockwise motion until they are free from base.
2. Remove the base from the stand of the scope.
   (Beware of Ground washer on outcropped foot location)
3. Remove the wire that runs from the ballast to the On/Off Switch blade connector.
4. Using the screw driver push on tab in the lamp socket, remove the wire that runs from the ballast.
5. Remove the two retaining machine screws holding the ballast to the base.

B. Assembly

1. Reassemble of the assembly is the reverse of steps 1-5 part A.

NOTE: Be sure to reinstall ground washers in the correct position to insure proper grounding.

12.0 FUSE REMOVAL AND REPLACEMENT

CAUTION: If base is to be removed to gain access to electrical components disconnect the microscope from the power source.

CAUTION: Fuse Replacement - The fuse is not user serviceable. It must *be replaced by qualified service personnel. The fuse can be replaced* only *with the same size, type and rating of fuse.*

5x20 TYPE T 250mA 250V

Tools

1. 3mm hex key wrench
2. Small regular screw driver 1/8" blade. (help remove protective cover)

Materials

1. Replacement fuse 13WFAG20044 (Qty. 1, for 110V; Qty. 2, 230V)

CAUTION: Only use the exact replacement fuse or fire and/or shock hazard may result.

Procedure

A. Disassembly

1. Using the 3mm hex wrench loosen the retaining screw inside the feet. Unscrew the feet using a counter clockwise motion until they are free from base.
2. Remove the base from the stand of the scope.
   (Beware of ground washer on outcropped foot location)
3. Remove the protective fuse cover from fuse base. (screw driver will help removal process for cover and fuse).
4. Remove fuse by working it free from fuse base with a screwdriver.

B. Assembly

1. Push new fuse into fuse base, install protective cover over fuse base.
2. Install base onto stand and repeat steps 1 and 2 of part A in reverse.

NOTE: Be sure to reinstall ground washers in the correct position to insure proper grounding.

13.0 ON/OFF SWITCH REMOVAL AND REPLACEMENT

CAUTION: If base is to be removed to gain access to electrical components disconnect the microscope from it's power source.

Tools

1. 3mm hex key wrench
2. Small regular screw driver 1/8" blade
   (help wire and switch removal)
3. Needle nose pliers

Materials

1. Replacement On/Off Switch Assembly 13WSWT20024

Procedure

A. Disassembly

1. Using the 3mm hex wrench loosen the retaining screw inside the feet. Unscrew the feet using a counter clockwise motion until they are free from base.
2. Remove the base from the stand of the scope.
   (Beware of ground washer on outcropped foot location)
3. Remove the 4 wires from switch (pull the Blade connectors from switch with needle nose pliers). Identify the location of wires on switch tabs.
4. Using the screw driver, push on of the switch retaining tabs towards the switch, while pushing the corresponding end out of base. Repeat process to the other side. Work the switch free from base.

B. Assembly *(Note: Switch markings: 0 = off and 1 = on; 0 is toward front of base)*

1. Push new switch into base, but do not engage locking tabs.
   The "0" switch marking should face toward the front of the base.
   Push blade connectors on switch terminals tight.
2. Push switch back into base until locking tabs engage base.
3. Install base onto stand and repeat steps 1 and 2 of part A in reverse.

NOTE: Be sure to reinstall ground washers in the correct position to insure proper grounding.

14.0 REMOVAL AND INSTALLATION OF BINOCULAR BODY

Tools

1. 2mm hex key wrench

Materials

1. Replacement Allen type set screws 13X54242 (1 if required)
2. Binocular Body Thumb Screw 1332000-124 (1 required)

Procedure

A. Disassembly

1. Using the 2mm hex wrench, loosen the set screws. Unscrew the screw using a counter clockwise motion approximately five turns. Remove the thumb screw completely.
2. Remove body.

B. Assembly

1. Prior to installation of the body, clean the area inside the stand with a cotton swab to remove any paint chips that could migrate into the objectives. Relubricate as required.
2. Install the Binocular Body. Install the new set screws (if required) in the left side and the thumb screw in the right side.
3. Turn left set screw in until it bottoms on the internal ring. Turn in the thumb screw until it bottoms, back-out for desired swivel movement is obtained.

15.0 REMOVAL AND INSTALLATION OF MONOCULAR AND TEACHING BODY

Tools

1. 2mm hex key wrench

Materials

1. Replacement Allen type set screws 13X54242 (1 pair, if required)

Procedure

A. Disassembly

1. Using the 2mm hex wrench, loosen the set screws. Unscrew the screws using a counter clockwise motion approximately five turns.
2. Remove body.

B. Assembly

1. Prior to installation of the body, clean the area inside the stand with a cotton swab to remove any paint chips that could migrate into the objectives.
2. Install the Monocular and Teaching Body and install the new set screws (if required).
3. Turn screw in until it bottoms on the internal ring, back-out for desired swivel movement is obtained.